

Epidemiology of hypertension in selected towns of Wollega zones, Western Ethiopia, 2019: A community-based cross-sectional study

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Abstract

Introduction: Hypertension remains an emerging public health problem globally, particularly in developing countries. Age, income level, obesity, alcohol consumption, smoking, vegetables and fruit consumption, physical activity and chat chewing were some risk factors of hypertension. However, there are limited data on the epidemiology of hypertension in Ethiopia. This study aimed to assess Epidemiology of Hypertension among the community of selected towns of Wollega zones.

Methods: A community-based cross-sectional study was conducted from 1 to 30 June 2019 in selected towns of Wollega zones. A multistage sampling technique was used to select 840 study participants. Data were collected using the WHO STEP wise approach. The data were coded and entered into EpiData 3, and exported to SPSS version 20.0 for analysis. Bivariate and multivariable logistic regression analyses were conducted. Statistical significance was declared at p -value < 0.05 .

Results: The study included a total of 838 respondents with a response rate of 99.7%. The prevalence of hypertension was found to be 189 (22.6%) (95% confidence interval = 19.9%–25.2%). Of this, 108 (12.9%) and 81 (9.7%) of female and male were hypertensive, respectively. Age groups of 30–44 years (adjusted odds ratio = 2.65 (1.43, 4.89)), 45–59 years (adjusted odds ratio = 3.55 (1.79, 7.04)), above 60 years (adjusted odds ratio = 2.97 (1.43, 6.18)), having history of alcohol consumption (adjusted odds ratio = 4.29 (2.4, 7.66)), involving in vigorous physical activity (adjusted odds ratio = 0.096 (0.028, 0.33)), not walking to and from the work (adjusted odds ratio = 13.12 (8.34, 20.67)), being overweight (adjusted odds ratio = 1.98 (1.21, 3.25)), inadequate fruits serving per day (adjusted odds ratio = 2.93 (1.75, 4.88)) were significantly associated with hypertension.

Conclusion: The prevalence of hypertension was found to be high in the study area. Older age, alcohol consumption, not engaging in vigorous activity, physical inactivity, being overweight and inadequate intake of fruits were found to be risk factors for hypertension. Therefore, health care providers should provide extensive health education and promotion on recommended lifestyle modification to tackle the burden of hypertension.

Keywords

Epidemiology, hypertension, Wollega zones, West Ethiopia

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Introduction

Non-communicable disease (NCD) remains the top cause of death globally. Cardiovascular diseases account for most deaths, with an estimate of 17.9 million people annually in 2018. Hypertension remains an emerging public health problem globally, particularly in developing countries. Globally, about 1.13 billion people are affected by hypertension, from which low- and the middle-income country accounts for more than two-thirds.^{1,2}

Nowadays, low- and middle-income countries are facing a double burden of increasing non-communicable and

communicable diseases. Unless controlled, hypertension may induce a significant impact on the economy and severe health complications including death. It aggravates the risk

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of cardiovascular disease and leading risk factors for coronary heart disease, heart failure, stroke, renal failure, and peripheral arterial disease.^{3,4}

The magnitude of hypertension is varying across the regions and country income groups. It is more prevalent in low- and middle-income countries (31.5%) than higher-income (28.5%).⁵ The prevalence of hypertension is 40.41% in Romania,⁶ 39.8% in Morocco,⁷ 28.1% in Ghana,⁸ 26.4% in Uganda,⁹ 23% in Northern Angola,¹⁰ 20.5% in southern China,¹¹ and 17% in India.¹² Hypertension is also dramatically increasing in Ethiopia, particularly in urban communities. The findings of studies conducted in different towns showed the high burden of hypertension in Ethiopia. The prevalence of hypertension was 28.3% in Gonder,¹³ 24.43% in Diredawa,¹⁴ 22.4% in Durame,¹⁵ 16.9% in Bedele,¹⁶ and 12.5% in Debre Markos town.¹⁷

Systematic review and meta-analysis conducted in Ethiopia in 2015 showed that about 19.6% of the Ethiopian populations have hypertension.¹⁸ Studies have shown that different factors are contributed to hypertension. Socio-demographic characteristics—such as age, sex, income level, educational level, family history of hypertension, and body mass index (BMI)—showed association with hypertension.^{19–24} Behavioral factors such as alcohol consumption, smoking, vegetables and fruit consumption, physical activity, and chat chewing were also associated with hypertension.^{22,25}

Studies also showed the increasing prevalence of hypertension is positively associated with urbanization. Major risk factors associated with hypertension such as low physical activity and high BMI are associated with urbanity.^{26,27}

Despite the surge in burden and prevalence of hypertension in developing countries including Ethiopia, the implementation of WHO recommendation is below the standard.²⁸ Lifestyle interventions became an effective non-pharmacological intervention in the prevention and management of hypertension. By engaging in regular physical activity, avoiding tobacco use, and secondhand tobacco smoke, choosing fruits and vegetables, avoiding food high in salt, sugar, and fat and maintaining normal body weight, one can reduce the risk of cardiovascular disease hypertension in focus. Through practicing a healthy diet, regular activity, and avoiding tobacco smoke, at least 80% of premature death from heart disease and stroke could be avoided.²⁹

Hypertension is known as a silent killer for which most hypertensive patients do not recognize their symptoms; therefore, community-based blood pressure screening plays a pivotal role in early diagnosis, and reduces further mortality and morbidity. Exploring the epidemiology of hypertension significantly helps in reducing the mortality and morbidity associated with hypertension. However, there are limited data on the epidemiology of hypertension in Ethiopia, and no study was conducted in Western Ethiopia. Therefore, this study was aimed to assess epidemiology of hypertension among the community of selected towns of Wollega zones, Western Ethiopia, from 1 to 30 June 2019. The finding of the

study will help the policymakers to contribute to designing the prevention and control strategy.

Methods and materials

Study design, setting, and population

A community-based cross-sectional study using the multi-stage sampling technique was conducted from 1 to 30 June 2019. Wollega zone is divided into four independent zones, namely, East Wollega zone, West Wollega zone, Kellem Wollega zone, and Horro Guduru Wollega zone. From these four zones, three zones were selected randomly. The study was conducted in the three selected towns of Wollega zones, namely, Nekemte town of East Wollega zone, Shambu town of Horro Guduru Wollega zone, and Ghimbi town of West Wollega zone, Western part of Ethiopia. According to the Central statistics agency, total population was 110,640, 22,100, and 45,600 in Nekemte, Shambu, and Ghimbi towns, respectively. The source population of the study was all ambulatory adults aged from 18 to 69 years old residing in the study area. The study population was the systematically randomized 18–69 aged adults of both sexes based on the inclusion criteria in the study area. The study unit was randomly selected individuals in the randomly selected households. All ambulatory adults aged between 18 and 69 years old who had willing to participate, who can hear and speak were included in the study and unwilling individuals and critically ill and unstable personnel were excluded from the study.

Sample size determination and sampling techniques

The sample size was calculated by single proportion formula considering 95% confidence interval (CI), 5% of margin of error (d), and proportion (p) of 8.9% from the study conducted in Gilgel Gibe, Jimma, for the overall prevalence of NCDs.³⁰ Based on the WHO STEP wise approach, designing effect of 1.5 and parameter estimates of 2 age groups for each sex (i.e. 4 age-sex estimates) was considered. After adding 10% non-response, the final sample size became 840. The multistage sampling technique was used. Selected towns of three zones—Nekemte of East Wollega, Ghimbi of West, and Shambu of Horro Guduru Wollega—were selected purposively. Kebeles found in each selected town were selected by lottery method; finally, households were selected by systematic random sampling technique. An eligible person in the household was selected. In a case where there was more than one person who can fulfill the inclusion criteria, one was selected by lottery method.

Data collection tool and procedure

Data were collected using the WHO STEP wise approach. STEPS is a sequential process, starting with gathering information on key risk factors by the use of questionnaires (Step 1),

then moving to simple physical measurements (Step 2), and only then recommending the collection of blood samples for biochemical assessment (Step 3).³¹

The data collection tool included socio-demographic, behavioral, and physical measurement-related questions. The data collectors were interviewed socio-demographic and behavioral-related questions, and then they were asked to allow physical measurements for their height, weight, waist, and hip circumference (Step 2). Finally, they were given chance for biochemical measurements (Step 3). The data were collected by two laboratory technicians, two BSc nurses and two public health personnel, and supervised by three MSc qualified personnel.

Blood pressure was measured using adult size blood pressure cuff and taken on the left arm with the participant in the sitting position. Three systolic blood pressure (SBP) and diastolic blood pressure (DBP) measurements were taken at least 5 min apart. The average of the last two blood pressure readings was used in this analysis. Hypertension was defined as mean SBP ≥ 140 mm Hg or mean DBP ≥ 90 mm Hg or reported use of regular anti-hypertensive medication(s) was the dependent variable. BMI was calculated using the individual's body weight divided by the square of the height (kg/m^2), and it was categorized into underweight ($< 18.5 \text{ kg}/\text{m}^2$), normal ($18.5\text{--}24.9 \text{ kg}/\text{m}^2$), overweight ($25.0\text{--}29.9 \text{ kg}/\text{m}^2$), and obese ($\geq 30.0 \text{ kg}/\text{m}^2$).¹⁹ Height was measured without shoes, to the nearest centimeter, and weight was measured with the participant in light clothing and without footwear using a weighing scale to the nearest tenth of a kilogram.

Smoking status was analyzed based on the center for disease control and prevention (CDC) as never smoker, former smoker, and current smoker.³² Accordingly, a never smoker means an adult who has never smoked, or who has smoked less than 100 cigarettes in his or her lifetime. A former smoker means an adult who has smoked at least 100 cigarettes in his or her lifetime but who had quit smoking at the time of interview and current smoker means an adult who has smoked 100 cigarettes in his or her lifetime and who currently smokes cigarettes.

Low consumption of fruits and/or vegetables was defined as consumption of fruits and/or vegetables < 5 servings/day. Analysis of physical activity was measured by metabolic equivalent (MET) in minutes per day. MET is the ratio of the work metabolic rate to the resting metabolic rate. One MET is defined as 1 kcal/kg/h and is equivalent to the energy cost of sitting quietly. An MET is also defined as oxygen uptake in mL/kg/min with one MET equal to the oxygen cost of sitting quietly, around 3.5 mL/kg/min. Physically active was categorized if the total physical activity MET min/week is at least 600 and physically inactive if the total physical activity MET min/week is < 600 .³³

Study variables

Hypertension which was defined as SBP at or above 140 mm Hg and/or DBP at or above 90 mm Hg or reported use of

regular anti-hypertensive medication(s) was the dependent variable, and socio-demographic factors such as sex, age, educational status, recent work status; socio-economic factor such as income status (household wealth index); behavioral factors such as dietary habits, alcohol consumption, cigarette smoking, physical activities, sedentary behaviors, and clinical factors including BMI and waist-to-hip ratio (WHR) were the independent variables.

Data quality control

The questionnaire was translated to Afaan Oromoo, the local language for the study area, and then to the English language to check for consistency. Training with the practical session was given for the six data collectors and three supervisors for one full day. A pre-test was conducted on 5% of the total sample size (42 individuals) at one town of East Wollega and some modification was done based on the result. The supervisors checked the completeness of the questionnaires on spot daily.

Data processing and analysis

The data were coded and entered into EpiData 3.1. Then, it was exported to SPSS software version 20.0 for cleaning and analysis. All independent variables that had a significant association in bivariate analysis with p -value < 0.25 were entered into multivariable logistic regression. Multivariable logistic regression analysis was conducted to identify factors associated with hypertension. Statistical significance was declared at p -value < 0.05 with 95% CI. To check model fitness, the Hosmer–Lemeshow goodness-of-fit statistic was used, and the model had a $p = 0.12$ which is > 0.005 .

Ethical consideration

The ethical clearance was obtained from the Wollega University research ethics review committee (RERC) with a reference of WURERC 21/2019, and letter of support was written for respective zone and town administrators. All participants in the selected households were assured all the objective of the study, their full right to participate in the study, and or withdraw in between in case they were not comfortable with the interview.

Results

Socio-demographic characteristics of the participants

The study included a total of 838 respondents with a response rate of 99.7%. The majority of study participants, 484 (57.8%) of them were female. The mean age of the study participants was 39.1 with standard deviation (SD ± 14.4) and the majority 337 (40.2%) were aged 30–44 years. Concerning marital status, about two-thirds (69.9%)

Table 1. Socio-demographic and socio-economic status of the study participants, selected towns of Wollega zones, Western Ethiopia, 2019 ($n = 838$).

Variables and categories		n (%)
Sex	Male	354 (42.2)
	Female	484 (57.8)
Age category	18–29	243 (29.0)
	30–44	337 (40.2)
	45–59	152 (18.1)
	≥60	106 (12.6)
Marital status	Single	170 (20.3)
	Married	586 (69.9)
	Divorced	43 (5.1)
	Widowed	39 (4.7)
Educational level	Illiterate	96 (11.5)
	Primary level	128 (15.3)
	Secondary level	229 (27.3)
Main work status over the past 12 months	College and above	385 (45.9)
	Government employee	239 (28.5)
	Non-government employee	44 (5.3)
	Self-employed	231 (27.6)
	Student	77 (9.2)
	Home-maker	25 (3)
	Retired	37 (4.4)
Wealth index	Unemployed (able to work)	115 (13.7)
	Unemployed (unable to work)	70 (8.4)
	Poorest	88 (10.5)
	Poor	243 (29)
	Medium	238 (28.5)
	Wealthy	105 (12.5)
	Wealthiest	164 (19.5)

of them were married. Three hundred and eighty-five (45.9%) of the study participants attended college and above. Concerning the main work of the past 12 month's one in four of the participants, 239 (28.5%) were government employed followed by self-employed 231 (27.6%). Regarding of wealth index, 243 (29%) of participants were in the poor category (Table 1).

Behavioral characteristics of the respondents

Tobacco and alcohol consumption. The majority 808 (96.4%) of the study participants were not currently smoking. Only five (0.597%) of the respondents claimed that there was someone who smokes in the house in the past 30 days from the data collection period. The mean age at first starting smoking was 28.21 ± 10.13 . Of the total study participants, 36 (4.3%) of them had ever consumed any tobacco product. According to the CDC classification for smoking status, 96.4%, 2.5%, and 1.1% were the prevalence of never, current, and former smokers, respectively. Regarding the alcohol consumption status of the study participants, 106 (12.6%) of them had a history of alcohol consumption among which 96 (91.4%) and 94 (89.5%) of them were drinking alcohol in

the past 30 days and 12 months, respectively. Ten (9.5%) of them were drinking at least one standard alcohol in the past 12 months daily.

Dietary intake-related characteristics of the respondents

The mean days the respondents eat a fruit per week was 1.26 ± 1.7 and the mean servings of fruits per day were 2.49 ± 0.9 . The mean days they eat vegetable was 0.68 ± 1.1 with the mean servings of the vegetables per day was 1.97 ± 0.67 . Regarding the dietary salt, majority 577 (68.9%) of the study participants claimed that they add salt to the cooking wot just after finishing cooking. The 638 (76.1%) of the respondents responded as they eat processed food high in salt always and about 731 (87.2%) of the study participants declared that too much salt causes health problem.

Level of physical activities

Concerning the physical activities experienced by the study participants, only 100 (11.9%) of them involved in vigorous physical exercises while about two-third, 566 (67.5%) and 557 (66.5%) involved in moderate physical exercises and use a bicycle or walking to get to and from places, respectively.

The mean day the respondents participated in vigorous activities per week was 0.41 ± 1.23 and the meantime they involved in each vigorous activity per day was 0.21 ± 0.79 h. The mean days the participants involved in moderate activities per week were 2.93 ± 2.32 and the meantime they involved in the moderate activities was 1.12 ± 1.12 h. The mean days they walk or use a bicycle to and from work per week were 3.22 ± 2.56 with a mean time of 1.11 ± 1.13 h. The mean time spent in sitting in hours was 3.74 ± 3.65 . Generally, the majority of the study participants 611 (72.9%) were physically active.

Physical measurements and life style-related results

Blood pressure was measured using adult-sized BP cuffs three times within 15 min ranges of rests. Accordingly, the average measurement of both systolic and diastolic was taken. The mean average SBP and DBP was measured to be 118.1 ± 18.71 mm Hg and 77.27 ± 14.21 mm Hg, respectively. The mean BMI of the study participants was 22.69 ± 4.13 . Thirty-four (4.05%) of the study participants were obese (Figure 1).

The mean WHR of the study participants was found to be 0.94 ± 0.1 . The prevalence of obesity in male and female was 74.6% and 76.4% according to the WHO cut off points, respectively. Concerning age, 72% of individuals within age category of 18–29 years, 71.8% of individuals within age category of 30–44 years, 82.9% of individuals within age

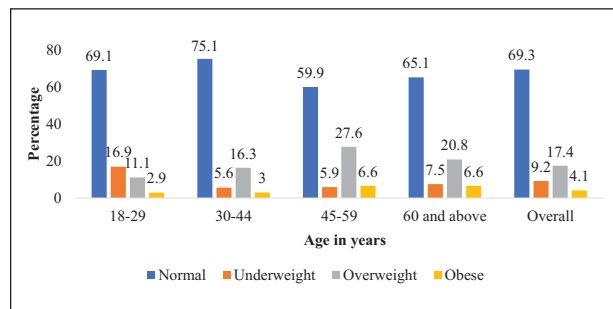


Figure 1. Distribution of body mass index by age of the study participants, towns of Wollega zones, West Ethiopia, 2019 ($n = 838$).

category of 45–59 years and about 85.8% of individuals within age of 60 and above were obese (Figure 2). Among the total study participants, 267 (31.9%) had visited health professionals in the past 12 months.

Prevalence of high blood pressure

The prevalence of high blood pressure as measured three times and the average SBP of ≥ 140 mm Hg and/or DBP of ≥ 90 mm Hg and those who were on medication during the data collection period was found to be 189 (22.6%) (95% CI = 19.9%–25.2%). One hundred eight (12.9%) and 81 (9.7%) of female and male were hypertensive, respectively. Respondents whose age 30–44 years old was more prevalent (9.07%) than other age groups classified. The prevalence was higher in those who married which were 18.1%. The prevalence was slightly higher, 6.9%, in government employees followed by self-employed respondents which were 6.8%. The prevalence of raised blood pressure in those who were physically inactive was nearly two times higher than those who were physically active.

Factors associated with hypertension

In bivariable analysis, age, history of smoking cigarettes, number of smoked cigarettes in lifetime, history of alcohol consumption, physical activity condition, BMI, and fruit serving conditions were found to be candidate variables for multivariable analysis at p -value < 0.25 with 95% CI. After adjustment in the final model, age, history of alcohol consumption, engaging in vigorous activity, walking, BMI, and fruit serving conditions were significantly associated with high blood pressure at p -value < 0.005 .

The odds of developing high blood pressure were 2.65 times (adjusted odds ratio (AOR) = 2.65 (1.43, 4.89)), 3.55 times (AOR = 3.55 (1.79, 7.04)), and 3 times (AOR = 2.97 (1.43, 6.18)) higher among adults in the age group of 30–44 years, 45–59 years, and above 60 years in compared to those aged between 18 and 29 years, respectively. The odds of developing high blood pressure were four times higher

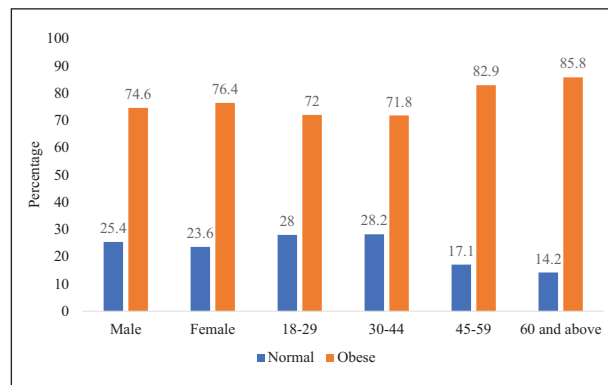


Figure 2. Waist-to-hip ratio by age category and sex of the study participants, towns of Wollega zones, Western Ethiopia, 2019 ($n = 838$).

among those who had a history of alcohol consumption compared to those who do not have a history of alcohol consumption odds ratio (OR) = 4.29 (2.4, 7.66). Involving in vigorous physical activity was about 90% prevents the risk of high blood pressure (AOR = 0.096 (0.028, 0.33)).

The odds of developing high blood pressure were 13 times higher among those who do not walk to and from the work compared to their counterparts (AOR = 13.12 (8.34, 20.67)). The odds of developing high blood pressure were two times higher among overweight compared to those who had normal BMI (AOR = 1.98 (1.21, 3.25)). Those who served inadequate fruits per day developed high blood pressure about 2.93 times higher than those who served adequate fruits per day (AOR = 2.93 (1.75, 4.88)) (Table 2).

Discussion

This study aimed to assess the prevalence and associated factors of hypertension among adults living in selected towns of Wollega zones, West Ethiopia. The study result indicated that almost one in four persons in the study area was hypertensive. This result is higher when compared to the national level study conducted in 2015 (15.6%) by Ethiopian public health institute and Ethiopian federal ministry of health based on WHO STEP wise approach for NCDs.³⁴ The possible reason for this discrepancy could be because of the increasing trend of urbanization and life style which is dramatically changing. Factors associated with urbanization may contribute to detrimental implications for the increment of NCDs, hypertension in focus.

The study result revealed that the prevalence of hypertension was 22.6%. This is consistent with study done in North Angola (23%), Durame (22.4%)^{10,15} and lower than study done in Romania (40.41%), Morocco (39.8%), Gonder (28.3%), Dire Dawa (24.43), Uganda (26.4%), and Ghana (28.1%)^{6-9,13,14} But it is higher than study done in India (17%), Bedele (16.9%), and Debre Markos (12.5%)^{12,16,17} The possible reason for this discrepancy could be due to the

Table 2. Factors associated with hypertension among adults in selected town of Wollega zones, Western Ethiopia, 2019.

Variable		Blood pressure status		COR (95% CI)	AOR (95% CI)	p-value
		High	Normal			
Age category	18–29	19 (7.8)	224 (92.2)	1	1	
	30–44	76 (22.6)	261 (77.4)	3.43 (2.01, 5.85)	2.65 (1.43, 4.89)	0.002*
	45–59	56 (36.8)	96 (63.2)	6.87 (3.88, 12.2)	3.55 (1.79, 7.04)	<0.001*
	>60	38 (35.8)	68 (64.2)	6.58 (3.56, 12.17)	2.97 (1.43, 6.18)	0.003*
Ever smoke	Yes	20 (55.6)	16 (44.4)		1.7 (0.63, 4.56)	0.29
	No	169 (21.1)	633 (78.9)	1	1	
Number of cigarettes smoked in life time	<100 sticks	176 (21.6)	637 (78.4)	1		
	100 and above sticks	13 (52)	12 (48)	3.92 (1.76, 8.75)	0.83 (0.09, 7.16)	0.86
Ever alcohol drinking	Yes	51 (48.1)	55 (51.9)	3.99 (2.6, 6.1)	4.29 (2.4, 7.66)	<0.001*
	No	138 (18.9)	594 (81.1)	1	1	
Vigorous activity	Yes	3 (3)	97 (97)	0.092 (0.029, 0.29)	0.096 (0.028, 0.33)	<0.001*
	No	186 (25.2)	552 (74.8)	1	1	
Moderate activity	Yes	66 (11.7)	500 (88.3)	1	1	
	No	123 (45.2)	149 (54.8)	6.25 (4.4, 8.88)	1.25 (0.73, 2.14)	0.41
Walk to and from the work	Yes	43 (7.7)	514 (92.3)	1	1	
	No	146 (52.1)	134 (47.9)	13.02 (8.82, 19.23)	13.12 (8.34, 20.67)	<0.001*
Physical activity status	Physically active	69 (11.3)	542 (88.7)	1	1	
	Physically in active	120 (52.9)	107 (47.1)	8.8 (6.14, 12.65)	0.46 (0.185, 1.16)	0.1
BMI	<25	117 (17.8)	541 (82.2)	1	1	
	25–29.9	58 (39.7)	88 (60.3)	3.05 (2.07, 4.48)	1.98 (1.21, 3.25)	0.006*
	>30	14 (41.2)	20 (58.8)	3.24 (1.59, 6.59)	1.38 (0.56, 3.43)	0.48
Fruits servings per day	Adequate	136 (20.1)	541 (79.9)	1	1	
	Inadequate	53 (32.9)	108 (67.1)	1.95 (1.34, 2.85)	2.93 (1.75, 4.88)	<0.001*

COR: crude odd ratio; CI: confidence interval; AOR: adjusted odd ratio; BMI: body mass index.

*Shows significant association at p -value < 0.05.

difference in socio-economic status of the populations and the sample size considered in the study.

The odds of developing high blood pressure were higher among older and middle age compared to young age individuals. This is supported by the study done in North West Ethiopia,¹⁹ Durame,¹⁵ Kenya,²³ Gonder,¹³ and Sub-Saharan Africa²⁰ in which older age was associated with hypertension. The possible explanation for this could be due to the fact that the physiologic changes with age contributed to the development of hypertension. High blood pressure related to aging is most likely related to arterial changes, aging results in narrowing of the vessel lumen and stiffening of the vessel walls this turns to high blood pressure.³⁵

The odds of developing hypertension were four times higher among those who consume alcohol compared to their counterparts. This could be due to the fact that alcohol can increase blood pressure. In addition to this calorie contained in alcohol is also a risk factor for weight gain, which is the leading risk factor for hypertension.³⁶ This is supported by a study done in North West Ethiopia,¹⁹ Gilgel Gibe, south West Ethiopia,²⁵ and Debre Markos.¹⁷

Regular physical exercise plays a pivotal role in preventing hypertension. Vigorous physical activity was found to be a preventive factor of raised blood pressure. In this study,

involving in vigorous physical activity was about 90% prevents the risk of high blood pressure. This is supported by a study done in Gilgel Gibe,²⁵ in which physical inactivity is associated with the prevalence of NCDs including hypertension.

Urbanization and use of motorized transport may contribute to sedentary lifestyles, which have detrimental implications for the increment of NCDs, hypertension in focus. In this study, the odds of developing high blood pressure were 13 times higher among those who do not walk to and from the work compared to their counterparts. Walking can minimize the risk of high blood pressure by achieving body weight maintenance. This is supported by a study done in Gonder¹³ and Durame.¹⁵

Obesity is the leading risk factor for the prevalence and burden of cardiovascular disease. It is highly associated with the increment of hypertension.³⁷ The odds of developing high blood pressure were two times higher among overweight compared to those who had normal BMI. This result is consistent with the study done in Durame,¹⁵ North Angola,¹⁰ Uganda,⁹ Debre Markos,¹⁷ Sub-Saharan Africa,²⁰ Dire Dawa¹⁴ and North West Ethiopia.¹⁹ Findings indicated that a higher intake of fruits and vegetables has a beneficial effect on hypertension prevention, through improvement in

body weight regulation.³⁸ In this study, those who served inadequate fruits and vegetables per day developed high blood pressure about 2.93 times higher than those who served adequate fruits and vegetables per day. This finding is in line with the study done in Gilgel Gibe²⁵ and Durame.¹⁵

Limitation of the study

This study has certain limitations. First, due to the cross-sectional nature of the data, the study cannot show a cause and effect relationship between hypertension and associated risk factors. Second, the study involved only town dwellers which make the study finding not representative for the rural residents. Finally, behavioral related data were collected by a structured questionnaire using the interviewer-administered method. Therefore, the effect of recall bias and social desirability bias cannot be ruled out.

Conclusion

The prevalence of hypertension was found to be high in the study area. Older age, alcohol consumption, not engaging in vigorous activity, physical inactivity, being overweight and inadequate intake of fruits was found to be risk factors for hypertension. Therefore, health care providers should provide extensive health education and promotion on recommended lifestyle modification to tackle the burden of hypertension.

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Author contributions

B.R., B.B., and G.M. involved in conceptualization of the study, participated in its design, and analyzing the finding. B.R. performed the result writing. B.B. involved in analyzing the finding. G.M. involved in writing the manuscript. All authors read and approved the final manuscript.

Availability of data and materials

The data sets used for this study are available from the corresponding author on reasonable request.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Ethical approval

The study was reviewed and approved by the Institutional Review Boards of Wollega University Ethical review board with a reference of WURERC 21/2019.

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Informed consent

Written informed consent was taken from study participants and written consent taken from the legally authorized representatives of the minor subjects was approved by the RERC of Wollega University prior to study initiation.

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Supplemental material

Supplemental material for this article is available online.

References

1. World Health Organization. *Global Status Report on Non-Communicable Disease*. Geneva. World Health Organization, 2018, <https://www.who.int/news-room/fact-sheets/detail/non-communicable-diseases>
2. World Health Organization. *Global status report on hypertension*. Geneva: WHO, 2019, <https://www.who.int/news-room/fact-sheets/detail/hypertension>
3. Kasper D, Fauci A, Hauser S, et al. *Harrison's principles of internal medicine*, 19e, 2015, <https://accessmedicine.mhmedical.com/content.aspx?bookid=1130§ionid=79720773>
4. World Health Organization. *Global Health Risks; Mortality and Burden of Disease Attributable to Selected Major Risks*. Geneva, Switzerland: World Health Organization, 2009, https://www.who.int/healthinfo/global_burden_disease/GlobalHealthRisks_report_full.pdf
5. Mills KT, Stefanescu A and He J. The global epidemiology of hypertension. *Nat Rev Nephrol* 2020; 16: 223–237.
6. Dorobantu M, Darabont R, Badila E, et al. Prevalence, awareness, treatment, and control of hypertension in Romania: results of the SEPHAR Study. *Int J Hypertens* 2010; 2010: 970694.
7. El Achhab Y, Nazek L, Maalej M, et al. Prevalence, control and risk factors related to hypertension among Moroccan adults: a multicentre study. *East Mediterr Health J* 2019; 25(7): 447–456.
8. Dosoo DK, Nyame S, Enuameh Y, et al. Prevalence of Hypertension in the Middle Belt of Ghana: A Community-Based Screening Study. *Int J Hypertens* 2019; 2019: 1089578.
9. Guwatudde D, Mutungi G, Wesonga R, et al. The epidemiology of hypertension in Uganda: findings from the national non-communicable diseases risk factor survey. *PLoS ONE* 2015; 10(9): e0138991.
10. Pires JE, Sebastião YV, Langa AJ, et al. Hypertension in Northern Angola: prevalence, associated factors, awareness, treatment and control. *BMC Public Health* 2013; 13(1): 90.
11. Ma WJ, Tang JL, Zhang YH, et al. Hypertension prevalence, awareness, treatment, control, and associated factors in adults

- in southern China. *American Journal of Hypertension* 2012; 25(5): 590–596.
12. Bhadoria AS, Kasar PK, Toppo NA, et al. Prevalence of hypertension and associated cardiovascular risk factors in Central India. *J Family Community Med* 2014; 21(1): 29–38.
 13. Awoke A, Awoke T, Alemu S, et al. Prevalence and associated factors of hypertension among adults in Gondar, Northwest Ethiopia: a community based cross-sectional study. *BMC Cardiovas Disorder* 2012; 12(1): 113.
 14. Roba HS, Beyene AS, Mengesha MM, et al. Prevalence of hypertension and associated factors in Dire Dawa City, Eastern Ethiopia: a community-based cross-sectional study. *Int J Hypertens* 2019; 2019: 9878437.
 15. Helelo TP, Gelaw YA and Adane AA. Prevalence and associated factors of hypertension among adults in Durame Town, Southern Ethiopia. *PLoS ONE* 2014; 9(11): e112790.
 16. Bonsa F, Gudina EK and Hajito KW. Prevalence of hypertension and associated factors in Bedele Town, Southwest Ethiopia. *Ethiop J Health Sci* 2014; 24(1): 21–26.
 17. Kiber M, Wube M, Temesgen H, et al. Prevalence of hypertension and its associated factors among adults in Debre Markos Town, Northwest Ethiopia: community based cross-sectional study. *BMC Res Note* 2019; 12(1): 406.
 18. Kibret KT and Mesfin YM. Prevalence of hypertension in Ethiopia: a systematic meta-analysis. *Public Health Reviews* 2015; 36(1): 14.
 19. Abebe SM, Berhane Y, Worku A, et al. Prevalence and associated factors of hypertension: a cross-sectional community-based study in Northwest Ethiopia. *PLoS ONE* 2015; 10(4): e0125210.
 20. Guwatudde D, Nankya-Mutyoba J, Kalyesubula R, et al. The burden of hypertension in sub-Saharan Africa: a four-country cross sectional study. *BMC Public Health* 2015; 15: 1211.
 21. Mahadir Naidu B, Mohd Yusoff MF, Abdullah S, et al. Factors associated with the severity of hypertension among Malaysian adults. *PLoS ONE* 2019; 14(1): e0207472.
 22. Shukuri A, Tewelde T and Shaweno T. Prevalence of old age hypertension and associated factors among older adults in rural Ethiopia. *Integr Blood Press Control* 2019; 12: 23–31.
 23. Joshi MD, Ayah R, Njau EK, et al. Prevalence of hypertension and associated cardiovascular risk factors in an urban slum in Nairobi, Kenya: a population-based survey. *BMC Public Health* 2014; 14(1): 1177.
 24. Abdul-Razak S, Daher AM, Ramli AS, et al. Prevalence, awareness, treatment, control and socio demographic determinants of hypertension in Malaysian adults. *BMC Public Health* 2016; 16(1): 351.
 25. Alemseged F, Haileamlak A, Tegegn A, et al. Risk factors for chronic non-communicable diseases at Gilgel Gibe Field Research Center, Southwest Ethiopia: population based study. *Ethiop J Health Sci* 2012; 22: 19–28.
 26. Ibrahim MM and Damasceno A. Hypertension in developing countries. *Lancet* 2012; 380(9841): 611–619.
 27. Allender S, Lacey B, Webster P, et al. Level of urbanization and noncommunicable disease risk factors in Tamil Nadu, India. *Bull World Health Organ* 2010; 88: 297–304.
 28. Nyaaba GN, Stronks K, de-Graft Aikins A, et al. Tracing Africa's progress towards implementing the non-communicable diseases global action plan 2013–2020: a synthesis of WHO country profile reports. *MC Public Health* 2017; 17: 297.
 29. Weldearegawi B, Ashebir Y, Gebeye E, et al. Emerging chronic non-communicable diseases in rural communities of Northern Ethiopia: evidence using population-based verbal autopsy method in Kilte Awulaelo surveillance site. *Health Policy Plan* 2013; 28(8): 891–898.
 30. Mulneh AT, Haileamlak A, Tessema F, et al. Population based Survey of Chronic non-communicable diseases at Gilgel Gibe Field research center, Southwest Ethiopia. *Ethiop J Health Sci* 2012; 22: 7–18.
 31. World Health Organization. The WHO STEP wise approach to chronic disease risk factor surveillance (STEPS): 2005, Geneva, www.who.int/chp/steps
 32. CDC. National Health Interview Survey, https://www.cdc.gov/nchs/nhis/tobacco/tobacco_glossary.htm (accessed 25 April 2020).
 33. World Health Organization. GPAQ: global physical activity questionnaire. Prevention of Noncommunicable Diseases Department, WHO. https://www.who.int/ncds/surveillance/steps/resources/GPAQ_Analysis_Guide.pdf
 34. Ethiopian Public Health Institute. *Ethiopian STEPS report on risk factors for NCDs and prevalence of selected NCDs*. Addis Ababa, Ethiopia: Ethiopian Public Health Institute, 2016.
 35. Singh JN, Nguyen T and Dhamoon AS. *Physiology, blood pressure age related changes*. Treasure Island, FL: Statpearls Publishing, 2019.
 36. Blood pressure UK. Helping you to lower your blood pressure. Drink less alcohol to avoid high blood pressure. Available at: <http://www.bloodpressureuk.org/your-blood-pressure/how-to-lower-your-blood-pressure/healthy-living/alcohol-and-your-blood-pressure/>
 37. Rhéaume C, Leblanc MÈ and Poirier P. Adiposity assessment: explaining the association between obesity, hypertension and stroke. *Expert Rev Cardiovasc Ther* 2011; 9(12): 1557–1564.
 38. Wang L, Manson JE, Gaziano JM, et al. Fruit and vegetable intake and the risk of hypertension in middle-aged and older women. *Am J Hypertens* 2012; 25(2): 180–189.